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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,801	04/01/2004	Gerald W. Iseler	AFB00698	9089

7590

07/07/2005

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EXAMINER
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ANDERSON, MATTHEW A

ART UNIT	PAPER NUMBER
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1722

DATE MAILED: 07/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/825,801

Applicant(s)

ISELER ET AL

Examiner

Matthew A. Anderson

Art Unit

1722

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 11-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 11- rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. (US 5,769,944) in view of Kurosawa et al. (JP-405097573 A).

Park et al. discloses a vertical gradient freeze (Bridgman) apparatus having means for applying a magnetic field. In Fig. 1, one can see that the apparatus consists of a vessel holding the charge and the seed crystal at the bottom. The top opens so that the crystal and raw material can be replenished.

Art Unit: 1722

A heater surrounds the vessel and lies inside a larger enclosure. An induction coil (50) supplies the magnetic field.

Park et al. does not suggest an electrode in the melt.

Kurosawa et al. discloses a Bridgman apparatus. Kurosawa et al. discloses an electrode immersed in the melt which controls the voltage in the melt:

It would have been obvious to one of ordinary skill in the art at the time of the present invention to combine the disclosure of Kurosawa et al. with Park et al. because the electrode of Kurosawa et al. can be used, according to the abstract, to limit damage to the vessel (i.e. crucible).

In respect to claims 11-13, it would have been obvious to one of ordinary skill in the art at the time of the present invention to form an apparatus including a vessel, an inner electrode inside the vessel and in contact with the melt but not the seed crystal, an outer electrode (i.e. the vessel itself) , a heater, means for applying a voltage across the electrodes, an induction coil around the vessel, a voltage source for the coil, because this is at least suggested by the combined references.

In respect to claims 15, the intended use of the apparatus is not germane to the patentability of the apparatus itself. However, since Park et al. discloses a vertical gradient freezing apparatus which implicitly suggests such temperature control means.

Art Unit: 1722

4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. combined above as applied to claims 11-13 above, and further in view of Niikura et al.

Park et al. combined does not explicitly disclose an electrode with inner annular spaces , an upper charge (i.e. melt raw material), and a heater.

Niikura et al. discloses an electrode with inner annular spaces , an upper charge (i.e. melt raw material), and a heater used to replenish a crystal growth melt.

It would have been obvious to one of ordinary skill in the art at the time of the present invention to combine the replenishment means of Niikura et al. with Park et al. since this would allow greater throughput in that the raw material melt could have been replenished.

It would have been obvious to one of ordinary skill in the art at the time of the present invention to form an apparatus as per claim 14 since then one would expect a greater amount of product from the apparatus.

5. Claims 16-19 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lorenz et al. (US 3,614,549).

Lorenz et al. discloses GaSb single crystalline material. This direct band gap semiconductor material is disclosed as having use as an infrared light emitter.

Art Unit: 1722

The semiconductor crystal of Lorenz et al. appears to at least anticipate the semiconductor crystals of claims 16-19 since therein is disclosed a single crystal semiconductor (GaSb). It is unclear if the level of defect density in Lorenz's material is comparable to that of the present invention. However, in absence of evidence to the contrary, one of ordinary skill in the art would expect such semiconductor materials to have low defect density.

***Claim Rejections - 35 USC § 112***

6. The above rejections are based on the assumption that the below terms are removed.
7. The term "more uniform" in claim 16 is a relative term which renders the claim indefinite. The term "more uniform" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.
8. The term "low defect" in claim 18 is a relative term which renders the claim indefinite. The term "low defect" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Art Unit: 1722

***Conclusion***

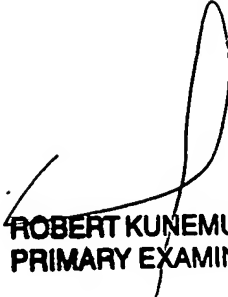
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew A. Anderson whose telephone number is (571) 272-1459. The examiner can normally be reached on M-F, 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MAA  
June 27, 2005

Art Unit: 1722



**ROBERT KUNEMUND  
PRIMARY EXAMINER**